What is claimed is;

1. A method for designing an optical system having a surface with a film formed thereupon, comprising the steps of:

a first step for preparing a data on the film;

a second step for preparing a data on said optical system; and

a third step for calculating an optical wavefront of said optical system including the film based upon the data prepared in said first step and said second step.

2. A method for designing an optical system according to claim 1, further comprising:

a fourth step for optimizing at least one of said data on the film and said data on the optical system based upon the results of the calculation of the optical wavefront performed in said third step.

3. An optical system designed through a designing method according to claim 1.

4. An optical system designed through a designing method according to claim 2.

5. A recording medium having recorded therein a designing program for designing an optical system, wherein:

a designing program comprises a designing method according to claim 1.

6. A computer receivable carrier wave carrying a signal that contains a designing program for designing an optical system, wherein:

said signal contains a designing program that comprises a designing method according to claim 1.

7. A method for designing an image-forming optical system having a surface with a film formed thereupon, comprising the steps of:

a first step for calculating an optical wavefront of said image-forming optical system without taking into consideration the presence of the film;

a second step for calculating an optical wavefront of said image-forming optical system with taking into consideration the presence of the film;

a third step for comparing the results of the calculation performed in said first step and the results of the calculation performed in said second step; and

a fourth step designating said image-forming optical system so that a wavefront aberration calculated through said second step is less significant compared to a wavefront aberration calculated through said first step.

8. An optical system having a surface with a film formed thereupon designed to manifest a less significant wavefront aberration of said optical system calculated by including the film than a wavefront aberration of said optical system calculated without taking the film into consideration.

9. An optical system according to claim 8, wherein:
said optical system is an image-forming optical system.

10. An optical system according to claim 9, wherein:

said surface with the film formed thereupon is a reflecting surface.

11. An optical system according to claim 10, wherein:
said optical system is utilized under EUV radiation.

12. An optical system according to claim 8, wherein:
said surface with the film formed thereupon is a reflecting surface.

13. An optical system according to claim 12, wherein:
said optical system is utilized under EUV radiation.

14. An optical system according to claim 8, wherein:
the wavefront aberration said optical system calculated without taking into consideration the presence of the film is larger than the wavefront aberration of said optical system calculated by including the film by $\lambda/14$ or more in RMS with λ representing the design wavelength.

15. An optical system according to claim 9, wherein:
the wavefront aberration of said optical system calculated without taking into consideration the presence of the film is larger than the wavefront aberration of said optical system calculated by including the film by $\lambda/14$ or more in RMS with λ representing the design wavelength.

16. An optical system according to claim 10, wherein:
the wavefront aberration of said optical system calculated without taking into consideration the presence of the film is larger

than the wavefront aberration of said optical system calculated by including the film by $\lambda/14$ or more in RMS with λ representing the design wavelength.

17. An optical system according to claim 16, wherein:
said optical system is utilized under EUV radiation.

18. An optical system according to claim 8, wherein:
the average of a P-polarized light and an S-polarized light is used when calculating the wavefront aberrations.

19. A projection exposure apparatus that projects and exposes a reduced image of a pattern provided at a projection original onto a workpiece, comprising:
an illuminating optical system that illuminates the projection original;
and
an optical system according to claim 9, wherein;
the projection original can be placed on an object surface of said optical system and the workpiece can be placed on an image surface of said optical system.

20. A projection exposure method for projecting and exposing a reduced image of a pattern provided at a projection original onto a workpiece, comprising the steps of:
a first step for preparing an optical system according to claim 9;
a second step for preparing the projection original on an object surface of said optical system;
a third step for illuminating the projection original;

a fourth step for preparing the workpiece on an image surface of said optical system; and

a fifth step for forming the reduced image of the pattern on the workpiece through said optical system.

21. A recording medium having recorded therein a designing program for designing an image-forming optical system having a surface with a film formed thereupon,

wherein said a designing program comprising;

a first step for calculating an optical wavefront of said image-forming optical system without taking into consideration the presence of the film;

a second step for calculating an optical wavefront of said image-forming optical system with taking into consideration the presence of the film;

a third step for comparing the results of the calculation performed in said first step and the results of the calculation performed in said second step; and

a fourth step for designing said image-forming optical system so that a wavefront aberration calculated through said second step is less significant compared to a wavefront aberration calculated through said first step.

22. A computer receivable carrier wave carrying a signal that contains a designing program for designing an image-forming optical system having a surface with a film formed thereupon,

wherein said designing program comprising:

a first step for calculating an optical wavefront of said image-forming optical system without taking into consideration the presence of the film;

a second step for calculating an optical wavefront of said image-forming optical system with taking into consideration the presence of the film;

a third step comparing the results of the calculation performed in said first step and the results of the calculation performed in said second step; and

a fourth step for designing said image-forming optical system so that a wavefront aberration calculated through said second step is less significant compared to a wavefront aberration calculated through said first step.